INTRODUCTION

1.0 INTRODUCTION AND LOCATION

Uranium Resources Inc. (URI) proposes to develop an in situ uranium leach operation in Northern Duval County. The proposed project is located 11.5 U.S. air miles Northwest of San Diego off State Highway 44. Figure 1 illustrates the location of the Rogers Project.

This application is being submitted by URI to obtain a permit to develop the solution mine, obtain an aquiter exemption for the proposed production zone and obtain a permit to drill, complete and operate a disposal well at the proposed uranium recovery plant site. The well will be used to dispose of process waste, restoration waste and contaminated rainfall from the in situ leaching and recovery operations.

No proposed or existing in situ or surface mines are within five miles of the permit area boundary. No public water supply wells are within five miles of the permit area boundary.

2.0 GEOLOGY

2.1 Regional Geology

Duval County lies wholly within the Sand Plain subprovince of the Texas Gulf Coastal Plain. All of the county is situated on the northeast flank of the southeastern plunging snyclinal Rio Grand Embayment. Surfacial geology consists of either late Tertiary, early Quaternary sediments deposited by the Rio Grande fluvio-deltaic system or Holocene alluvial and eolion deposits.

Topography structure and stratigraphy of Duval Country are discussed in greater detail below.

2.1.1 Topography

Topography of Duval County is typical of south Texas Gulf Coastal Plains. Relief is generally 40 feet or less and surface gradients average less than 40 feet per mile. Drainage gradients (20 feet per mile plus) are somewhat higher than normal coastal plain. The drainage within Duval County is intermittent, which results in sediment clogged streams with gradients associated with semi-arid climates.

Because of this climate, extensive caliche development can be found throughout the county. Caliche forms a caprock armour which supports distinctive northeast-southwest trending escarpments found in northwest Duval Country.

Duval County lies between the Nueces River and Rio Grande drainage systems. Streams trend southweast and empty directly into the Texas Gulf. This feature combined with the low rainfall and high evaporation results in poorly defined drainage systems and in some cases, closed drainage basins.

2.1.2 Structure

Formations outcroping or underlying Duval County strike approximately N 25 E, and dip to the southeast at 15 to 80 feet per mile (Figs. 2, 3, 4,and 5). In localized areas dips may be reversed and/or increased to 180 feet per mile because of faulting or deformation proximal to salt dome development.

The county can be typed as a broad southeastern dipping monocline broken locally by one fault zone and an area of salt dome development. The fault zone trends northeast-southwest in the northwestern part of the county. Relief on the en echelon down to the coast faults (Fig. 1) is variable, but have sufficient closure for oil and gas entrapment. Local antithetic up the coast faults form bounding faults for horsts and grabens in the overall fault trend.

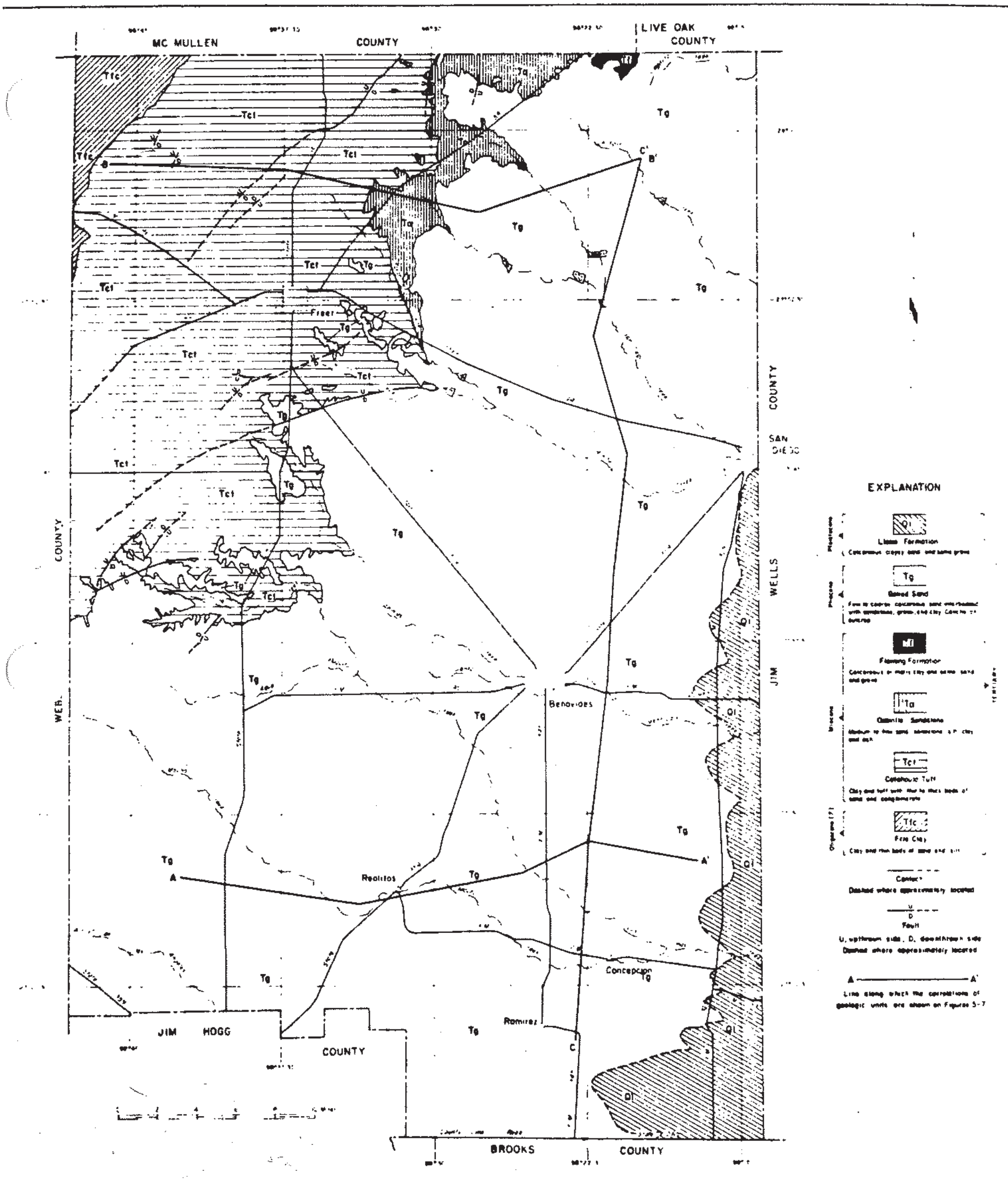


Figure 2

Geology

(From Shafer, G.H., Ground-Water Resources of Duval County, Texas: Texas Water Development Board, Report 181 P.9)

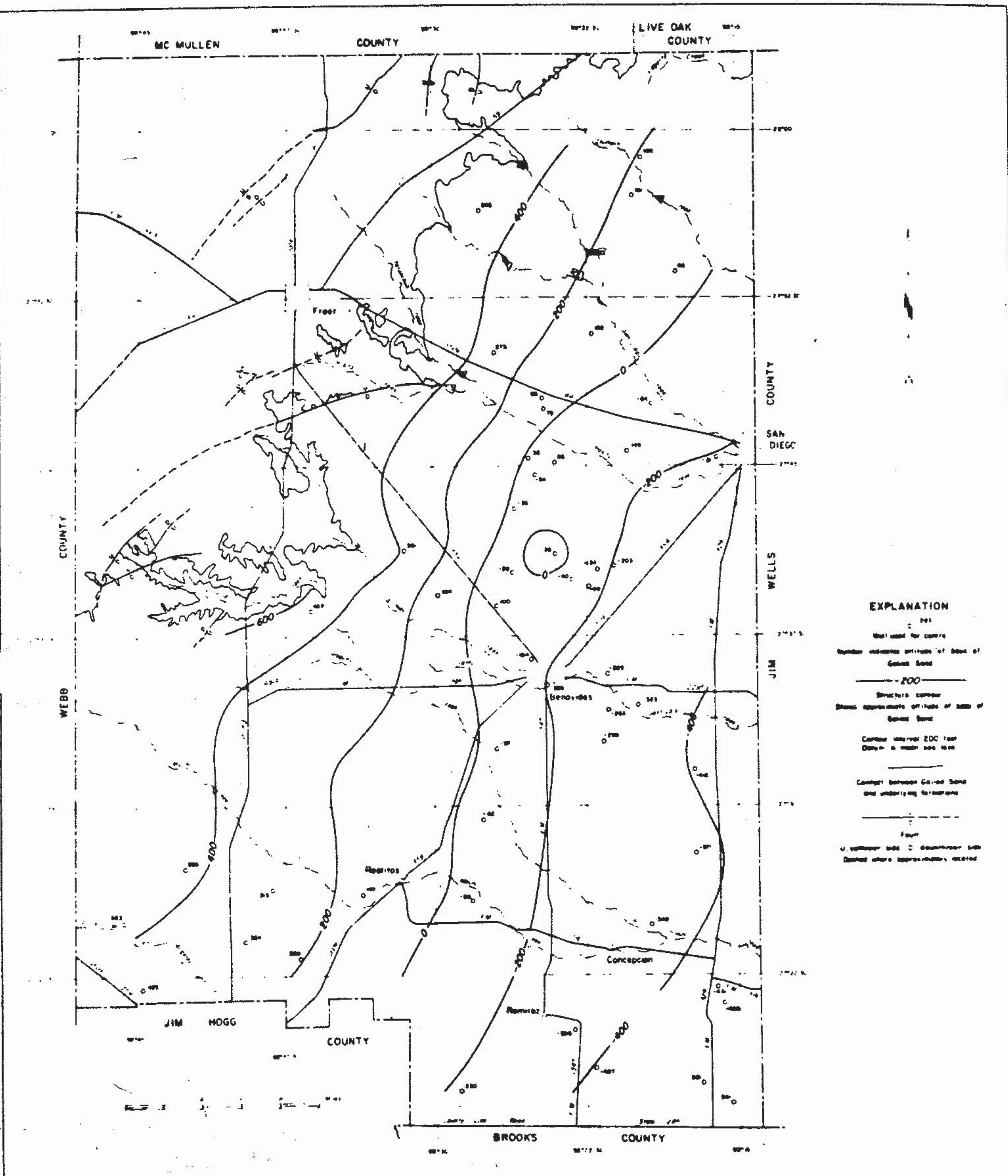


Figure 3

Approximate Altitude of the Base of the Goliad Sand

(From Shafer, G.H., Ground-Water Resources of Duval County, Texas: Texas Water Development Board, Report 181 P.21)

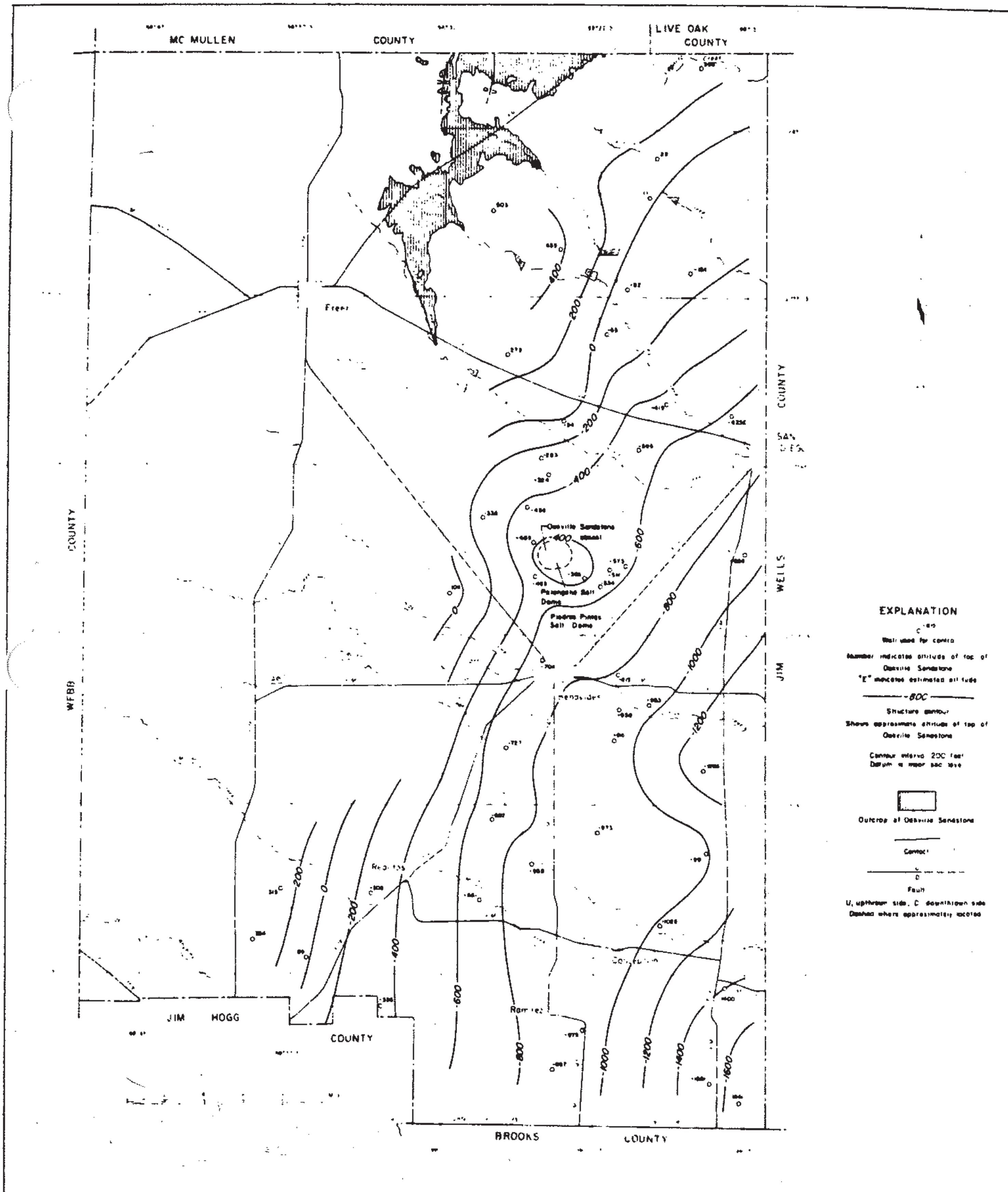


Figure 4

Approximate Altitude of the Top of the Oakville Sandstone

Base from U. S. Geological Survey topographic quadrangles and General Highway Map of the Texas Highway Department

(From Shafer, G. H., Ground-Water Resources of Duval County, Texas. Texas Water Development Board, Report 181 P.19)

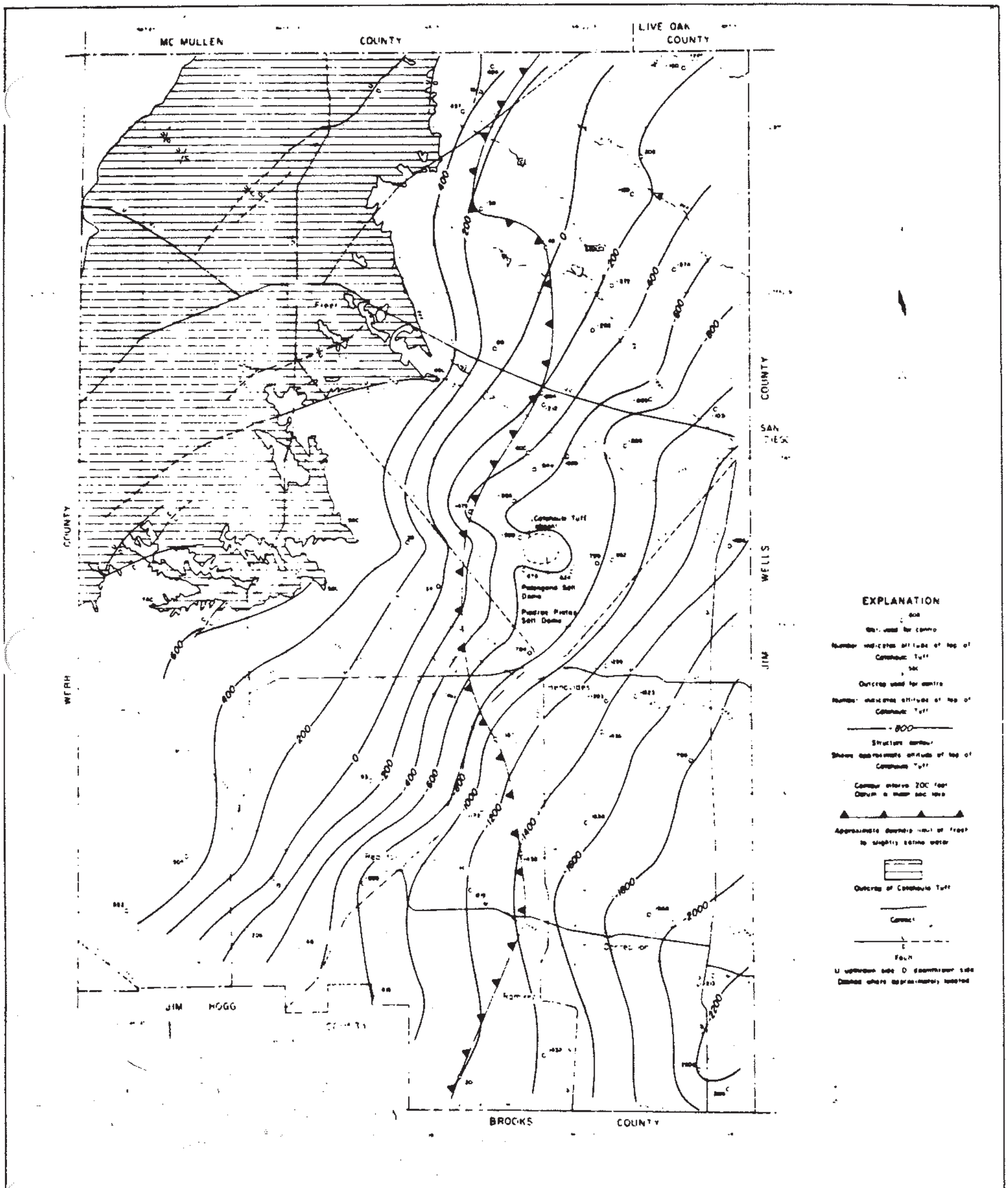


Figure 5

Approximate Altitude of the Top of the Catahoula Tuff

(From Shafer, G.H., Ground-Water Resources of Duval County, Texas: Texas Water Development Board, Report 181 P.17)

A second structural feature is the Palangana Salt Dome which is approximately six miles north of Benavides. Around the dome, structural attitude of sedimentary sequences are altered or reversed to the regional trend (Figs. 3, 4, and 5). On the dome, the Oakville and Catahoula units are absent, the influence of the dome has impacted the Goliad sediments.

The Piedras Pintas Salt Dome is not as large, nor does it have as much impact on local structure as the Palangana Dome. Intrusion of the Piedras Pintas Dome has altered the Oakville and Catahoula units, but has not altered the Goliad sediments significantly.

2.1.3 Stratigraphy

- Alluvium - Qal; Holocene -

Alluvial sequences in Duval County are found in and adjacent to southeastward trending intermittent streams. Spatially these deposits vary from a few tens of feet to 1.5 miles across and extend downstream from the point of integrated channel development until the channel transects strata of sufficient integrity that broad flood plain development is precluded. This point may be anywhere from 1-50 stream miles from the upstream origin.

Alluvial units are the youngest deposits in Duval County. Floodplain deposits are composed of dark grey to dark brown calcareous silt and clay, quartz sand, organic matter and some localized gravel units. Composition of floodplain sediments is determined by upland parent material.

- Eolian Sands - Qs; Holocene -

In the southeastern and southern part of Duval County sheet sand deposits form a thin surface mantle on underlying bedrock. Sheet sands are made up of reworked eolian deposits. The iron stained quartz sands range in thickness from one to a few tens of feet.

- Lissie Formation - Ql; Pleistocene -

The Lissie Formation crops out along the east edge of Duval County (Fig. 2). The Lissie unconformably overlies the Goliad Sand and is unconformably overlain by the Beaumont Formation (Pleistocene). Although a full section of Lissie is not present, formation thickness in adjacent counties average 200 feet.

The Lissie Formation consists of interspersed meanderbelt, levee, creavasse splay, and tributary channel sequences. Depositional environment for the Lissie is lower meanderbelt/upper deltaic plain in the Rio Grande depositional system.

Sands and gravels within the Lissie are reddish orange or mottled red in oxidized outcrops and greenish blue in the subsurface. The sands are angular to subangular quartz grains, while the gravels are moderately rounded to well rounded quartz, quartzite, chert and igneous extrusives. On outcrop, coarser clastics have moderate to extensive caliche cementation. Silts and clays in the Lissie display the same reddish orange coloration on oxidized outcrop and green to bluish grey in the subsurface.

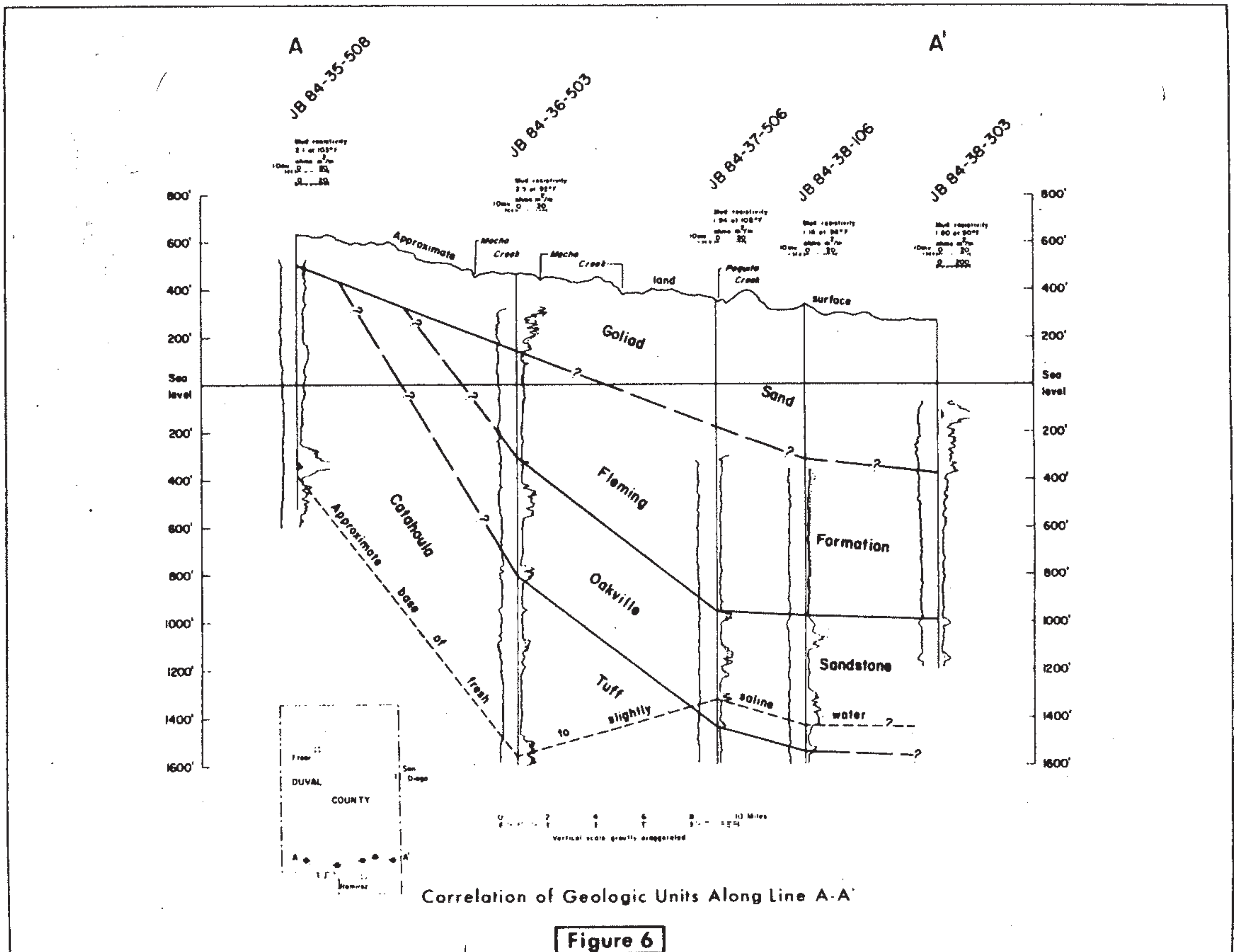
- Goliad Sand - Tg; Pliocene -

The Goliad Sand forms a northeast to soutwest outcrop belt in Duval County. This belt varies in width from less than 10 to more than 44 miles. Areal extent of the Goliad equals that of all other outcrops within the county (Fig 2). Goliad sediments range in thickness from zero at the up-dip limit to 600 feet in the subsurface.

Early depositional mode of Goliad sediments was bedload. Slight upwarp in west Texas coupled with increased rainfall produced sediment choked drainageways which disgorged their loads in blanket fashion across the south Texas Coastal Plain. Basal Goliad sediments consist of bimodal sands and gravel conglomerates with poor bed form development and have little sedimentary structure. Middle and upper Goliad sediments are finer grained have better sedimentary structure and bedform development; and have relict caliche cementation. This would indicate decreasing bedload energy, reduced source input, and a climatic change to an arid or semi-arid condition.

Oakville Sandstone - To; Miocene -

The Oakville Sandstone crops out in a "V" notched trend from north central to west central Duval County (Fig. 2). Outcrop width varies from less than a mile to 10 miles with greatest areal extent along major streams which have eroded away the onlapping Goliad Sand. The Oakville unconformably overlies the Catahoula Tuff and is conformably overlain by the Fleming Formation. The Oakville thins at the up-dip limit and thickens to 500 to 600 feet in the subsurface (Figs. 6, 7, and 8).



Correlation of Geologic Units Along Line A-A'

Figure 6

(From Shafer, G.H., Ground-Water Resources of Duval County, Texas: Texas Water Development Board, Report 181 p.11)

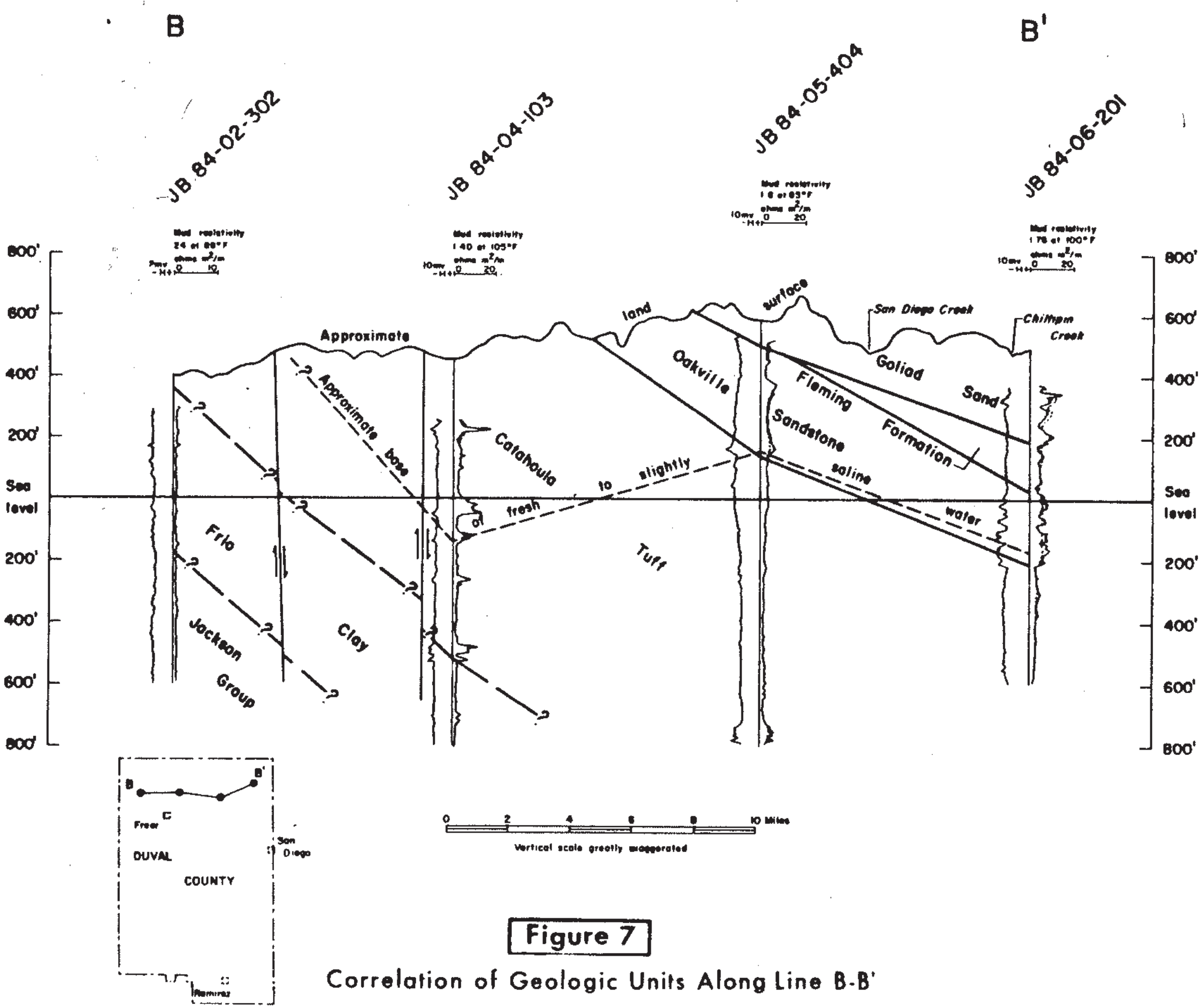


Figure 7

Correlation of Geologic Units Along Line B-B'

(From Shafer, G.H., Ground-Water Resources of Duval County, Texas
Texas Water Development Board 181 P.13)

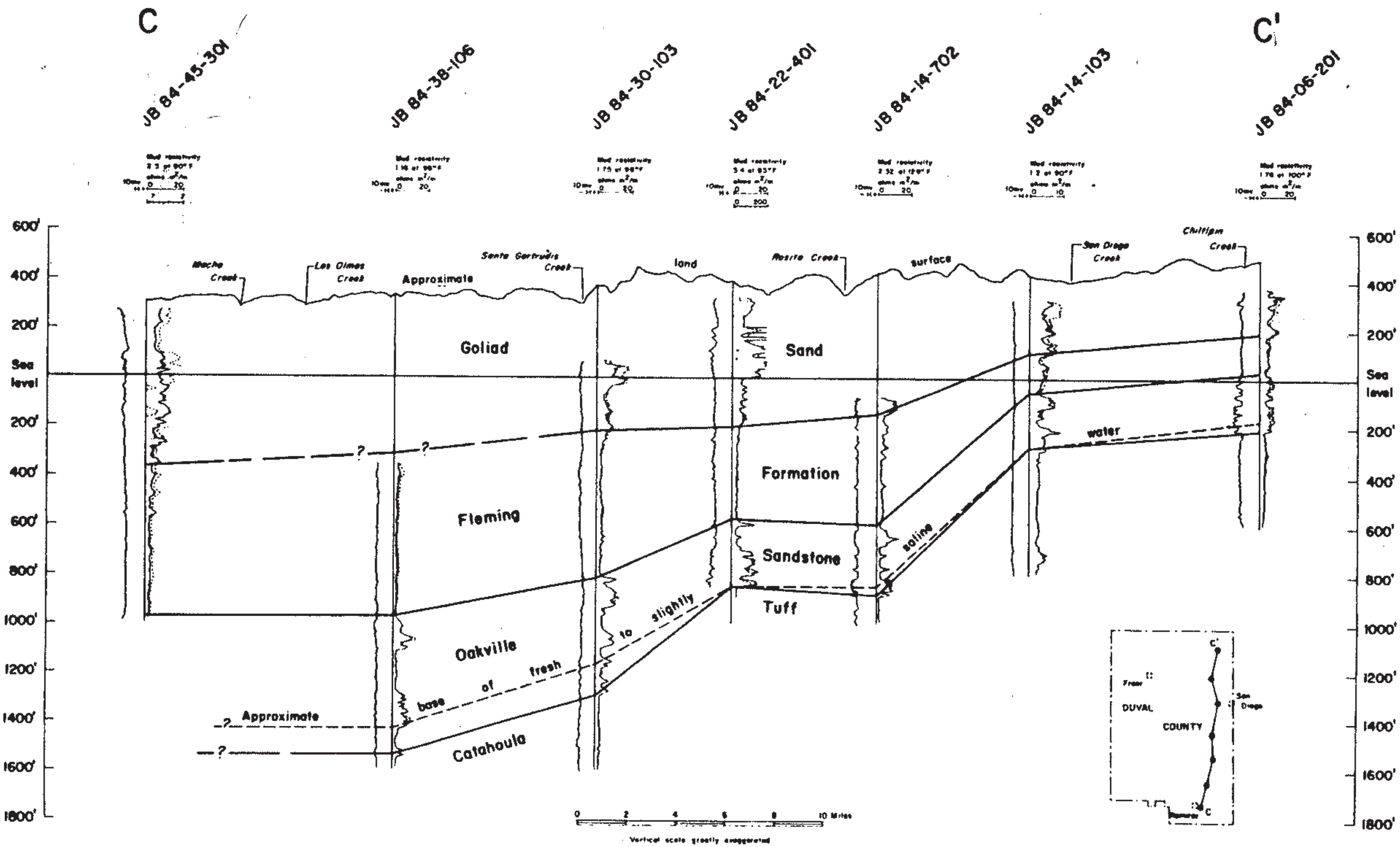


Figure 8

Correlation of Geologic Units Along Line C-C'

(From Shafer, G.H., Ground-Water Resources of Duval County, Texas
Texas Water Development Board, Report 181 P 15)

Deposition of the Oakville Sandstone represents the transition between the volcano-tectonism exemplified by the Catahoula Tuff and the relative quiessence of the Fleming. This is exhibited by smaller grain size in the Oakville as compared to the Catahoula and the continuous fining upward directional sequence from the Oakville through the Fleming. The depositional environment for the Oakville can be characterized as moderate upwarp in the west producing relatively high transport energies which support bedload deposition in broad channel sequences of moderate depth. These fining upward sequences with lower flow regime features and blanket extent signifies approachment to base level without significant climate change.

Oakville sediments are medium to fine grained subangular to subround quartz, chert, and obsidian clastics which increase in roundness and decrease in size in vertical sequence. Bedforms are broad and sedimentary structures are poorly developed in the basal units. Upper units have well developed cross bedding, ripples, and laminae. Isolated lenticular gravel beds are found in the Oakville. These gravels are medium to coarse quartz, quartizite, chert, fossil debris and some volcanics with varying degrees of roundness. On the outcrop, Oakville sediments weather to buff or yellowish orange. In the subsurface coloration is controlled by post depositional formation geo-chemistry. Oxidized sediments are yellow to reddish orange, while reduced sediments are bluish to greenish grey.

- Catahoula Tuff - Tct; Miocene -

The Catahoula Tuff forms the second largest outcrop belt in the county. Extending from north central to west central Duval County, the Catahoula outcrop width varies from 4 to 10 + miles. The Catahoula unconformably overlies the Frio Clay and Jackson Group and is in turn unconformably overlain by Oakville Sandstone and where the Oakville is absent, by the onlapping Goliad Sand. Formation thicknesses vary from 0 at the up-dip limit to 875 feet proximal to outcrop, and eventually thickens to 1400 feet in the subsurface of eastern Duval County.

There are three depositonal episodes evidenced in the Catahoula. Since sediments within the Catahoula indicate semi-arid to arid climates throughout, vertical differences in depositonal events are a product of activity variation in the west Texas area. The thick basal Fant Tuff Member was deposited from bedload streams transporting eroded volcanic ash. Lack of significant coarse clastics and thickness of sequence indicate a period of massive ash accumulation with little surface upwarp to provide transport energy. This sequence was broken when the Soledad Volcanic Conglomerate was deposited. Although volcanic activity did not cease, as evidenced by tuffaceous clays within the Soledad, increased clast size and broad definable channel sequences indicate greater transport energy, which is indicative of uplift in the source area. The Soledad conglomerate is characterized by sedimentary sequences deposited by sediment choked bedload streams with high sediment enhanced viscosities.

The upper Chusa Tuff deposition was a return to a beload sequence of ash deposit with little or no tectonic activity supporting high transport energies.

The Fant Tuff Member is predominately composed of white to off-white massively bedded tuff and tuffaceaous clays. Isolated interstratified greenish brown claystones and greenish grey to reddish orange fine grain sands provide the only contrast to the tuff. The Soledad Volcanic Member is composed of interstratified tuffs, tuffaceous clay, friable fine sands, and conglomerates. The tuffs and tuffaceous clays are similar to those of the Fant Tuff Member. Soledad sands are fine to very fine grained quartz and chert. Larger sediments consist of angular, subangular, and subrounded rhyolite, trachyte, trachyandesite clasts which range in size from pea gravel to boulder. These are either partially or totally suspended in a fine grain matrix. The Chusa Tuff is a massive to irregular bedded sequence of light grey to pink tuff and tuffaceous clay.

-Frio Clay - Tfc; Oligocene -

Outcrops of Frio Clay are confined to a north-south 1.5 to 4 mile wide band in northwestern Duval County (Fig. 2). The Frio conformably overlies the Jackson Group and is unconformably overlain by the Catahoula Tuff or the onlapping Golaid Sand (Fig. 7). Thickness in the subsurface ranges from 400 in the northern Duval County to 800 feet + in the southern part of the county.

Sediments in the Frio indicate fluviatile upper deltaic plain deposition with low transport energies. Sedimentation processes are similar to, if not the same as those at work during Jackson deposition. Jackson and Frio sedimentary sequences differ only in the non-volcanic compostion of the latter.

The Frio Clay is made up of light yellowish to brownish green clays interstratified with small discontinous sand and silty sand units. The sands are composed of fine grained noncalcareous slightly gypsiferous quartz grains.

2.2 Permit Area Geology

The stratigraphic section of interest at the Rogers Project is the Pliocene Goliad Formation.

The Goliad sands appear to represent a transgressive sequence and appear to have been deposited in a mixed fluvial-deltaic environment. A number of the sands coarsen upward in texture which is indicative of a delta front-stream mouth bar, while other sands fine upward in texture which characterizes joint bar deposition.

One mineralized sand has been recognized in the Goliad in an interval from approximately 150 - 260'. This sand thickness varies from 55 to 10 feet thick. The sand has arbitrarily been designated sand A and is illustrated on Cross Sections A-A' and B-B', C-C', D-D', E-E', F-F', G-G', H-H', I-I', J-J', K-K', L-L', M-M', N-N', O-O', Figures 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and will be the zones of uranium production.

Overlying the production sands is one additional Goliad sand horizon which has ben arbitrarily designated the B sand. Between the B sand and production sand is a 10 to 30 foot continuous clay horizon. The sand contains relatively fresh to slightly saline water.

The texture of the Goliad sands ranges from very fine (3.5 - 4.0 0) to very coarse (-.5 - 1.0 0) with a dominate grain size in the 1 - 2 0 range (medium sand).

No faulting has been documented within the Rogers acreage.

2.2.1 Stratigraphy and Mineralogy

The "A" unit consists mainly of fine to very fine-grained sandstones (70-90%) with interbedded clays, siltstones, and minor clay-pebble and lithic conglomerates. The sands commonly are massive, less often laminated, and only rarely cross-bedded. Typically they are loosely consolidated. However, the degree of induration is variable, and thin, hard, well-cemented zones occurs throughout the area.

The "A" sand is well-developed on the Rogers properties. It ranges in thickness from about 10 feet up to a maximum of 55 feet in a narrow, north-trending channel on the M. G. Rogers lease. The unit has an average thickness on the order of 25 to 30 feet.

Petrographic work establishes that the sands are lithic arenites, consisting of quartz (28-52% of framework grains), feldspar (7-18%), and rock fragments of various kinds, including in decreasing order of abundance carbonate rock fragments (7-26%), volcanic rock fragments (5-25%), chert (0-5%), and miscellaneous igneous and metamorphic rock fragments. The rocks contain a diverse assemblage of minor detrital constituents, the most important being titanomagnetite. Personnel have reported minor amounts of carbonaceous ("lignite") material in some cores.

Authigenic minerals in the "A" and "B" sands include montmorillonite clay, carbonate cement, ferric iron oxides, iron sulfides (pyrite and marcasite), zeolites, and uranium minerals (uraninite and/or coffinite), and a uranium-titanium phase. Except for montmorillonite and carbonate cement, which are ubiquitous, the occurrence of the other authigenic minerals is directly related to the processes which formed the uranium deposits at Rogers.

Montmorillonite of a calcium-rich nature occurs as a coating on most framework grains, and also coats other authigenic minerals as well. Carbonate cement, entirely calcite, occurs in quantities ranging from 6 to 35% of the total rock volume. It occurs mainly as sparry overgrowths on carbonate rock fragments, and as pore-filling cement composed of elongate bladed crystals and clusters of euhedral rhombohedrons. The cement and detrital carbonate fragments together constitute 12%-48% weight per cent of the Goliad sands and average about 20% $CaCO_3$.

Pyrite, along with minor amounts of marcasite, is a minor constituent of reduced sands. It occurs as framboidal clusters of crystals and as single euhedral crystals. In oxidized sands, the pyrite is partially or completely converted to ferric iron hydroxides and oxides. Fine coatings of various iron oxides give the oxidized sands their distinctive yellow to red coloration.

Uranium occurs in two main forms, questionably as the minerals uraninite (UO_2) and/or coffinite ($USiO_4$) in one form, and as brannerite (UTi_2O_6) .

2.2.2 Structure

The Cenozoic sedimentary units in south Texas form a structural monocline striking generally northeast, and dipping gently (1-2 degrees) to the southeast, into the Gulf Coast Basin. Syndepositional to post-depositional deformation, caused by strike-oriented, down-to-the-coast growth faulting and associated up-to-the-coast antithetic faults, along with effects due to sediment compaction, has resulted in local structural complexity. This commonly takes the form of steepening or flattening dips, with reversals of dip occurring near some faults. Abrupt thickening or thinning of sedimentary beds may occur on one or the other side of faults.

This kind of structural development is characteristic of rapidly-filled sedimentary basins such as the Rio Grande Embayment of south Texas. Some zones of growth-faulting appear to have been active over considerable periods of geologic time, giving rise to local areas of intensive structural and stratigraphic complexity.

The structural deformation caused by growth-faulting has resulted in the development of numerous structurally controlled hydrocarbon accumulations. Galloway (1977) has estimated that one-third of the South Texas Coastal Plain is underlain by closely spaced hydrocarbon reservoirs that are largely fault controlled.

Few details of the underlying structural fabric are visible at the surface in south Texas. Poor and limited outcrop exposures, and the montonous character of the stratigraphy basically precludes finding exposed beds that can be used in surface mapping as structural markers. Indications of zones of faulting can be obtained by noting the alignments of oil fields and present-day drainage features, and from the distribution of accumulations of valley-filling Quaternary alluvium.

The near-surface section beneath the Crews property is structurally relatively simple. The most prominent structural feature is a northeast-trending, northwest-dipping (up-to-the-coast) growth fault that cuts across the northwestern part of the T. W. Crews property northwest of the Rogers Properties. This fault displays a scissor-like offset, with displacement of beds being essentially nothing in the area where the fault crosses the W. F. Dopslauf-T. W. Crews property boundary, increasing to about 95 feet of throw where the fault trends off T. W. Crews to the southwest. No known faulting occurs in the areas being permitted.

2.3 Lease Ownership

The Rogers properties comprise a total 3162.63 acres with five major landowners. The attached Tobin Map illustrates the land position.

2.4 Topography and Drainage

The Rogers Leach Project lies in an area of relatively low relief. Upland gradients average 60 feet per mile increasing to 125 feet per mile in dissected areas adjacent to major drainage ways. Stream gradients for the unclaimed tributary to San Diego Creek average 20 feet per mile (Figure 26).

No major drainageway transects the Rogers permit area. The Rogers permit area lies wholly within the San Diego Creek drainage basin. The unnamed tributary to San Diego Creek has its confluence located approximately 3 miles east of the URI permit area. Much of the permit area lies within the tributary. Leach facilities in this area will be confined to well head equipment only. Surface extraction facilities and ancilliary buildings will all be located on uplands away from flood prone areas.